Maternal Reminiscing Style and the Development of Autobiographical Memory in Children:

The Impact of Auditory Comprehension

Claire A. Veazey

The University of North Carolina at Chapel Hill

Faculty Advisor – Dr. Peter Ornstein

Graduate Student Advisor – Ms. Hillary Langley

April 15th, 2013

A thesis presented to the faculty of The University of North Carolina at Chapel Hill in partial

fulfillment of the requirements for the Bachelor of Arts degree with Honors in Psychology.

Acknowledgments

First, I would like to thank my graduate student mentor, Ms. Hillary Langley, and faculty

advisor, Dr. Peter Ornstein, for their patient guidance during this honors thesis process, as well

as their unwavering faith in my abilities over the past four years. With their advice and

encouragement, I have been able to engage in a more exciting, personalized facet of

psychological research that I otherwise may not have experienced. I would also like to thank the

other members of my defense committee: Dr. Jennifer Coffman and Dr. Elizabeth Jordan. With

an incredibly positive attitude, Dr. Coffman has always been available to answer any question I

had, as well as providing much needed feedback and support for my research. Dr. Jordan has

also been a constant source of academic support throughout my undergraduate career, taking

great care in guiding my pursuit of a degree in psychology at UNC-CH.

Additionally, I appreciate all of the hard work put into every dimension of the Durham Child

Health and Development Study. Cathi Propper was essential to the process of obtaining the

necessary subset of data and measures for this particular study, and was always helpful when

questions arose. I would also like to acknowledge that this material is based upon work

supported and made possible by the National Science Foundation (Grant # BCS-0126475 and #

BCS-0720660).

Finally, I would like to thank my parents for encouraging me to love learning about myself and

the world around me, as well as teaching me to never settle for less than my "personal best". I

feel so blessed to have been surrounded by such selfless love and support from my family and

friends during my time as an undergraduate at UNC-CH, particularly during this last year as I

have been working on this honors thesis project.

Abstract

A great amount of past research has revealed the positive impact that an elaborative maternal reminiscing style has on the development of autobiographical memory in children. However, this work has been limited to populations of children with typically developing language skills (Fivush, Haden, & Reese, 2006). The current study was designed to explore the associations between children's language comprehension and their autobiographical memory on one hand, and their mothers' style of reminiscing on the other. Using data from the Durham Child Health and Development Study, 113 children were grouped according to their auditory comprehension (AC) scores (high v. low) when the children were 36 months old. A mother-child reminiscing task was used to measure children's autobiographical memory elaborations and maternal reminiscing style when children were 36 and 60 months old in order to assess the linkages both concurrently and longitudinally. Analyses revealed that (1) children's AC at 36 months was significantly correlated with their autobiographical memory performance and maternal reminiscing style at both 36 and 60 months, and (2) autobiographical memory in children and maternal style at both time-points differed significantly as a function of the child's language comprehension at 36 months. Both concurrently and longitudinally, children with lower language comprehension were likely to have lower autobiographical memory performance and less elaborative mothers. In contrast, children with high language comprehension were likely to have higher autobiographical memory performance and mothers who exhibited a more elaborative reminiscing style. By considering the amount of language that children comprehend, these results emphasize a need to account for child individual differences when examining the relations between maternal reminiscing style and autobiographical memory development over time.

Maternal Reminiscing Style and the Development of Autobiographical Memory in Children:

The Impact of Auditory Comprehension

The autobiographical memory system of children consists of personal memories of the past as well as the skills necessary to retrieve and report these memories. Studies have shown that this system develops markedly when children are between two and four years of age, coinciding with a number of other cognitive and social skills that enable them to understand personal experiences and effectively reminisce with others about their past (Ornstein, Haden, & San Souci, 2008). The development of language during this period provides an unprecedented means of engaging with others and expressing what has been experienced. Research indicates that through interactions with parents and other adults, children are able to establish a common understanding and representation of the world (Fivush, Haden, & Reese, 1996), and develop sense of "self" with a personalized past (Fivush & Reese, 1992).

Adult-structured conversations provide an excellent environment in which children are able to acquire the skills necessary to reminisce with others. Emerging from Vygotsky's Theory of Social Learning (1978), the "scaffolding" model of reminiscing development suggests that when children's language abilities are low at an early age, adults act as a model by providing the majority of the content and structure of the conversation. As children become more competent in their language and conversation skills, adults provide less content and structure and remove scaffolding accordingly. Ultimately, children are able to internalize the narrative structure that adults provide while engaged in conversation, and then later apply this learned structure to the encoding, storage, and retrieval of new memories on their own (Fivush, 1998). By three to four

years of age, children are able to fully participate in more autonomous, elaborate conversations with adults by asking questions and including their own personal details.

However, this scaffolding model may fall short when it is applied to a collective adult-child reminiscing context. Rather than simply removing support as children become more autonomous in the conversation, a "spiral" model may be applied in which the conversations become more complex as each partner is able to contribute effectively. In this model, the main objective of adults is to share experiences and collectively co-construct detailed narratives about past experiences with their increasingly autonomous children (Fivush et al., 1996).

Despite the attempts of these theoretical models to explain how children may learn the structure and function of conversations, Fivush and her colleagues (1996) emphasize that it is language that is an organizational tool and therefore an essential element of reminiscing. As children learn and practice the socially communicated narrative form in conversations about the past, their reminiscing ability becomes more efficient, and researchers hypothesize that their memories may therefore be encoded more efficiently as well (Fivush et al., 1996). In this way, language ability and autobiographical memory development are connected in the social reminiscing context.

However, it is important to reiterate that this linguistically-based reminiscing task occurs within a social environment that may be influenced by the individual differences of each partner. Research has shown that there is variability in the style that adults utilize when structuring conversations about the past with children (Fivush, Reese, & Haden, 2006; McCabe & Peterson, 1991; Hudson, 1990). Some adults are very involved in the conversation, and provide a lot of new information regardless of the amount of input that the child may be contributing, whereas

other adults may provide new information but are more interested in engaging the child in a more collaborative effort. The majority of the research on this variability has focused on mothers, due to the fact that mothers are still more likely than fathers to be the primary caregiver and therefore are more likely to experience and reminisce about events with their children.

When considering the variability of style that mothers utilize in conversations with their children, a number of researchers have shown that mothers tend to fall into two different classifications: high elaborative or low elaborative. It is important to note that most research that makes this distinction still maintains that maternal reminiscing style exists along a continuum of "elaborative-ness". Most mothers are at least somewhat elaborative; they are able to add new information when their children remember and recount details of a past experience. However the distinction primarily emerges when children are not contributing much to the conversation about the past. Where some mothers maintain an elaborative style regardless of how much information their child is contributing to the conversation, others may be less elaborative when their children's input into the conversation is low (Reese, Haden, & Fivush, 1993).

When considering what distinguishes a "high elaborative" mother from a "low elaborative" mother, there are several factors that should be taken into account. Mothers who utilize a "high elaborative" reminiscing style tended to use more (1) open-ended "wh-questions" (who, what, when, etc.) that encourage children to make memory contributions to the conversation, (2) make associations and "tie-ins" between the present event and other past events in order to help their children with remembering and reporting, and (3) provide positive evaluations of their children's contributions to the conversation (Fivush et al., 2006). Highly elaborative mothers also appear to be consistently more reactive to children's individual skill level and are more interested in the concept of co-constructing conversations than those mothers

with a low elaborative style. In contrast, mothers who utilize a "low elaborative" reminiscing style exhibit fewer of the features mentioned above, and tend to repeat the questions and information that they provide in the conversation. The purpose of the conversation tends to be more focused on testing children's memory performance rather than working collaboratively to reminisce about the event (Reese et al., 1993).

Given that children learn how to talk about and structure autobiographical memories from the reminiscing conversations they have with adults, as well as the fact that mothers demonstrate individual variability in the way that they reminisce with their children about the past, researchers have revealed that there is a significant linkage between maternal reminiscing style and children's autobiographical memory development. Children of highly elaborative mothers come to tell more detailed, elaborate, and coherent narratives of their personal past than do children of less elaborative mothers (Fivush et al., 2006). Additionally, Reese and her colleagues (1993) demonstrated that this relation between mothers' style and children's autobiographical memory occurs both concurrently and longitudinally. Compared to those children whose mothers utilized a less elaborative reminiscing style when they were 40 months old, not only did the children of highly elaborative mothers provide more memory elaborations at that time-point, but they consistently provided more memory elaborations in a reminiscing context after nearly a year had passed. Children whose mothers used an elaborative style with them when they were 40 months old exhibited higher recall concurrently and also longitudinally when their autobiographical memory performance was assessed at 58 and 70 months of age.

This research to date, focused on mother-child reminiscing conversations concurrently and longitudinally, has certainly informed us about the ways in which social interactions (namely mothers' contributions) are linked to children's enhanced memory performance. However, it

should be noted that many of the observed associations are correlational in nature (Haden, Ornstein, Eckerman, & Didow, 2001). In order to make causal statements about the hypothesized impact of elaborative conversation, it is important to carry out experimental studies in which the conversations to which children are exposed are manipulated. Reese and Newcombe (2007) conducted one of the first large-scale, longitudinal measures of children's autobiographical memory over time after training mothers to utilize a more elaborative style in interactions across five time-points when their children were between 1.5 to 2.5 years of age. Both early (2.5 months after last training) and later (15 months after last training) post-tests revealed that mothers who had received training exhibited a more elaborative style than those mothers who did not receive training, and had children who had higher autobiographical memory performance. The findings from this study, along with others (Boland, Haden, & Ornstein, 2003; Peterson, Jesso, & McCabe, 1999; Hedrick, Haden, & Ornstein, 2009), demonstrated that mothers could be taught to utilize a more elaborative reminiscing style, and that this intervention was associated with children's autobiographical memory performance concurrently and longitudinally.

Although young children's own observations may play a part in the encoding of personal experiences, it is their mothers' elaborative style and facilitation of their children's ability to remember their past that is associated with higher levels of later recall for the children (Ornstein, Haden, & Elischberger, 2010). Both classifications of maternal style (high/low elaborative) are consistent across time, context, and conversational partner (Haden, 1998; Reese et al., 1993), and become more elaborative over time. In other words, regardless of conversational style classification, both groups increased the amount of elaborative features used in a reminiscing context as a means of adjusting to their children's acquisition of narrative skills and increasing autonomy in conversation (Reese et al., 1993; Fivush et al., 2006). However, mothers'

conversational style also changes as a function of their child's typical development, transitioning

from informational statements and close-ended questions to more open-ended, wh-questions as

the child grows older (Farrant & Reese, 2000; Haden, Ornstein, Rudek, & Branstein, 2009). As

children become more competent conversation partners, the amount/complexity of content in

mothers' style tends to increase, even though the amount of maternal conversational structure

may decline. Mothers must have an accurate representation of their child's abilities in narrative

production in order to determine the amount of autonomy they can handle in conversation.

Fivush et al., (2006) utilized the term "maternal sensitivity" to describe the adaptive flexibility of

maternal conversational style. Based on the individual differences in their child's development,

such as gender, temperament, attachment style and language, it appears that mothers' style may

evolve over time as a function of the specific needs of their child.

It is important to consider the variability of individual characteristics in each partner

involved in mother-child reminiscing, and the impact that such characteristics may have on the

quality of the interaction. Studies have indicated that mothers are more elaborative with young

preschoolers who exhibit higher language skills, perhaps due to these children's advanced ability

to participate in the conversation (Farrant & Reese, 2000; Newcombe & Reese, 2004). However,

this linkage between child language ability and maternal conversational style does not appear in

the later years of preschool. This indicates that child language ability may have varying levels of

influence on reminiscing style throughout development (Reese & Brown, 2000; Reese et al.,

1993). However, Fivush and her colleagues (1996, 2006) indicate that although child individual

differences may have an impact on maternal reminiscing style to a certain extent, the direction of

influence is from mother to child, rather than a child-driven or bi-directional experience.

Whereas maternal reminiscing style has shown to be consistent over time and context, children's

participation in conversations is variable. These factors are evidence that mothers' style is subject to change based on the individual elaborations of the child (Fivush et al., 2006).

With language as such a prominent feature and useful tool in reminiscing and autobiographical memory development, the language skills of both mothers and their children emerge as potentially influential factors. Maternal classifications of conversational style have shown to be consistent over time, with mothers who utilize more elaborative techniques early in their children's life maintaining those skills and abilities throughout development (Fivush et al., 2006; Nelson & Fivush, 2004; Reese et al., 1993). However it is important to reiterate that an "elaborative-ness" does not equate with talkativeness. The amount that mothers talk to their children is less important than is her approach in the conversation. In other words, high elaborative mothers may talk less and in exchange ask more questions that allow children to engage in the conversation. In contrast, low elaborative mothers may exhibit a "quiz-like" approach, asking their children lots of yes-no, repetitive questions (Fivush et al., 2006).

Given the extensive foundation of research on autobiographical memory development and the impact of maternal conversational style, there is relatively little information available concerning the relation between autobiographical memory development and individual differences in children's language skills (Fivush et al., 2006). Harley and Reese (1999) found that children's early productive language at 19 months was a strong predictor of children's memory responses in mother-child and researcher-child reminiscing tasks at 19, 25, and 32 months. Language was assessed using a measure of total productive vocabulary, the MacArthur Communicative Development Inventory: Words and Sentences. Similarly, when examining the expressive vocabulary of 13 to 20 month-old infants during the time of encoding an event, Bauer and Wewerka (1995) found that it was correlated with infants' later verbal memory about the

event, defined as "verbal utterances that suggested memory of the event." In terms of autobiographical memory development, these findings illuminate the importance of children's early ability to effectively produce language and communicate with others, especially given that autobiographical memory is such a linguistically and socially-based system.

Following this notion that the variability of children's early language skills impact the extent to which children may benefit from social learning contexts such as mother-child reminiscing, it is interesting to consider if an association exists between children's language ability and maternal reminiscing style. Farrant and Reese (2000) found that mothers tended to be more elaborative with children who had higher language ability and conversations skills. This may indicate that children's participation in the conversation influences how much mothers are engaged as well. However, a study by Reese and Brown (2000) revealed a lack of a relation between children's general, expressive language ability and specific patterns of mother-child reminiscing, despite the fact that children's memory reports were significantly correlated with maternal style. This finding illuminates the notion that children's memory reports may not be simply a matter of their general language skill, but may reflect more complex, pragmatic elements of language.

Given the extensive foundation of research that has been conducted on the concurrent and longitudinal associations between maternal reminiscing style and children's autobiographical memory development, very few studies have addressed variability in children's language comprehension skills and its impact on autobiographical memory. Most researchers thus far have focused on the relation between autobiographical memory development and expressive communication, which is generally measured by the amount of words that children are able to produce at a given point in development. However, multiple studies have suggested that there

may be a disassociation between language comprehension and production, and that language comprehension may reflects a higher level of semantic-conceptual ability than early language production (e.g. Baumwell, Tamis-LeMonda, & Bornstein, 1997).

One of the few studies to address the children's language comprehension in the context of mother-child interactions was a study by Baumwell and colleagues (1997). Researchers found associations between early maternal sensitivity/responsiveness and the language comprehension of 9-13 month-old children. Parental efforts to help their children focus and participation in joint-attention activities were measured, in addition to language sensitivity, as an assessment of "sensitivity/responsiveness". Somewhat related to Vygotsky's Theory of Social Learning (1978) and conversation scaffolding, Braumwell et al. most generally defined parental "sensitivity/responsiveness" as a caregiver's ability to accurately assess children's language development and then match their style accordingly. Their findings support the notion that the development of language comprehension in children may benefit from adults that are sensitive to their children's skill level and adjusts support accordingly. Children's language comprehension was measured using a composite of two different parental reports: the Language and Gesture Inventory (Bates, Thal, Whitesell, Fenson, & Oakes, 1989) and the MacArthur Communicative Development Inventories (Fenson, Pethick, Renda, Cox, Dale, & Reznick, 2000).

These findings provide evidence for an underrepresented facet of autobiographical memory development, in which children's productive language ability is not only related to their autobiographical memory development and maternal conversational style in a mother-child reminiscing context, but also that children's specific ability to comprehend language within those interactions may be influential as well. Therefore, it is important to give due attention to this element of child language development and its impact on the developing autobiographical

memory system. Particularly given the amount of research that has supported the highly social and linguistic nature of autobiographical memory, it is also necessary to determine the effect that variability in children's language comprehension may have on conversational style that their mothers utilize in a reminiscing context.

The current study was designed to address this gap in the literature by concurrently and longitudinally investigating the relation between children's auditory language comprehension and their autobiographical memory performance as well as their mother's elaborative conversational style when reminiscing. Using a sample of children (n=113) from the larger Durham Health and Child Development study, we were interested in whether or not children's auditory comprehension at 36 months of age would predict autobiographical memory performance (AM) concurrently. Similarly, we were interested in whether or not children's auditory comprehension at 36 months of age would predict mothers' reminiscing style (number of elaborations) in a mother-child reminiscing context (MRM) concurrently. Lastly we were interested in the longitudinal associations between children's language comprehension and their memory development as well as how their mothers reminisce with them about the past. In other words, we wanted to know whether or not children's auditory comprehension (AC) at 36 months of age could predict their autobiographical memory performance (AM) and maternal reminiscing style in a mother-child reminiscing context when children were 60 months of age.

Method

Participants

The participants included in the current study were a subset of those enrolled in the Durham Child Health and Development Study (DCHD). This larger, longitudinal study had a

total sample of 206 families who were studied at ten different time points (when the children

were 3, 6, 12, 18, 24, 30, 36, 60, 72, and 84 months of age). This project was designed to assess

children's social, emotional, and cognitive development, as well as the implications of cultural

diversity, among other variables, for children's development. Participants were recruited from an

urban community through the use of fliers at birth/parenting classes, mailings, and cold calls

asking for participation in a longitudinal study of health and development in children. In order to

reduce confounds between Socioeconomic Status (SES) and race, four family groups were

targeted in the recruitment process: African American middle-income, African American low-

income, European American middle-income, and European American low-income.

From this larger sample, the current study was designed to examine two specific

measures of cognitive development at the 36 and 60 month time-points. Only those participants

from the larger sample who had completed the relevant tasks at both time-points were included

in the analysis, which reduced the sample to 113 mother-child dyads. Of those dyads, 23% were

African American middle-income (n= 27), 33% were African American low-income (n=37),

33% were European American middle-income (n=37), and 11% were European American low-

income (n=12).

Procedures / Tasks

Child Assessments. The participating children were classified at 36 months of age on the

basis of an assessment of their language (i.e., their auditory comprehension), and then

autobiographical memory performance and maternal reminiscing style were assessed

concurrently and over time as a function of this early auditory comprehension score.

Preschool Language Scale 4th Edition (PLS-4) (36 months). The PLS-4 (Zimmerman,

Steiner, & Pond, 2002) was administered at multiple time-points in the larger, longitudinal

DCHD study, and data from the 36 month administration of the task was used for the current

study. Assessing vocabulary, grammar, morphology, and language reasoning, the PLS-4 is a

measure of both expressive and receptive vocabulary in children from birth to 6 years 11 months

old. The two subscales included in the measurement are Auditory Comprehension and

Expressive Communication. Auditory Comprehension is an evaluation of precursors to language

development in a child, such as the ability to pay attention and react to speakers. Expressive

Communication determines what the child is actually capable of producing, and is a

representation of vocal development and social communication. Each subscale began with a

starting point based on the child's age, and a basal score (three consecutive correct responses)

was obtained for both the Expressive Communication and Auditory Comprehension sections

before proceeding with the study. If the child was unable to reach basal at his or her age-level

starting point, then the researcher continued to step down to preceding level until basal was

attained. Tasks were then administered until the child's ceiling score was achieved, which

occurred when he or she got 7 consecutive responses incorrect. Items were scored "1" for each

question if the pass criterion was met or if the child self-corrects a response, and a score of "0"

was given if pass criterion was not met or if responses were partially complete or incomplete.

Raw scores were then computed for each subscale by subtracting the number of incorrect items

after the "basal" score from the maximum "ceiling" score. From these raw scores, a standard

score was calculated based on the child's age in months (Zimmerman, Steiner, & Pond, 2002).

For the purposes of the current study, the standard scores of the Auditory Comprehension

subscale were utilized.

Mother-Child Reminiscing Task (36 and 60 months). This task was used to assess the ways in which mothers and children talk about previously experienced events. Prior to the assessment, each mother was instructed by the researchers to think of past events (preferably three) to discuss with her child. Specifically, the events chosen must have been unique, one-time events that the mother and child experienced together recently (within the last month). It was important that the events were non-routine in nature, so that children's memory during the task would be a reflection of autobiographical memory, and not just a generalized idea of what might happen during a routine event. The presence of both mother and child in the event selected was also emphasized, though other people could have been present during the event (Haden, 1998; Reese et al., 1993). Following the target event selection, the mothers were instructed to converse with their child as naturally as possible, with the goal of eliciting their child's recall of the events discussed. These conversations were videotaped in a lab setting, allowing the nonverbal cues of young children to be coded as well as the audible conversation that took place.

The video recordings were transcribed using the CLAN module transcription software. Each line began with a label indicating the speaker (*MOT: or *CHI:), followed by each utterance divided by clauses. This structure allowed for the Mean Length of Utterance to be calculated and each transcript could be examined closely as a whole conversation. The transcribers were also instructed to include comments about relevant non-verbal material in the videos in order to assist coders. The coding scheme for the current study was classified as a structural/ functional coding system (although similar in structure, utterances may be different in function and should therefore be coded differently), and adapted from guidelines established by both Haden (1998) and Reese, Haden, & Fivush (1993). However, six new association codes (e.g., general knowledge, fantasy, event, script, future, demo) were added for the purposes of the

DCHD study. This scheme allowed researchers to assess a wide array of conversational

techniques that mothers utilize in conversations to elicit memory recall from their children, as

well as children's varied conversational exchanges when reminiscing. Mothers' and children's

elaboration and association codes were of particular interest in the current study.

Maternal Coding Categories. The two main memory-relevant codes that could be

assigned to maternal speech were either *Elaborations* (mother adds new information that was not

previously mentioned) or *Repetitions* (mother reiterates something that she previously

mentioned). There are three main forms in which each of these two styles could be manifested,

including *General Memory Questions* (open-ended; e.g., "What kind of animals did we see?"),

Yes/No Questions (close-ended; e.g., "Did you have fun when we went to the zoo?"), and

Statements (e.g., "We ate hotdogs when we were there.").

Along with *Elaborations* and *Repetitions*, mothers' utilization of *Associative Talk* was

coded if statements or questions were made that were related, though not directly, to the event

under discussion. This type of talk provides opportunity for expansion upon the topic being

discussed, and offers more cues for the child to recall more memory details. There are six

classifications of Associative Talk: *Event* (about a comparable previous event; e.g., "We saw

fireworks a different night, didn't we?"), *General Knowledge* (related facts about the world; e.g.,

"Ponies are baby horses."), *Fantasy* (rather than factual; e.g., "What would we have done if it

had started raining?"), *Future* (future occurrence of event; e.g., "When can we go there again?"),

Demo (acting elements out), and *Scripted/Prep Talk* (how we generally do things).

For the current study, we were interested in the general level of "elaborative-ness" in

mothers' conversational style in the mother-child reminiscing task. Therefore, rather than

looking at the specific forms of maternal contributions in a reminiscing context we focused our analyses on variables that were total averages of Maternal Elaborations and Maternal Associations from the task as a whole. Generally in the mother-child reminiscing task, between two and four events are discussed by the mother-child dyad. Each of these event conversations was considered separately and totals of each code of interest are tallied for each event. Then, an average was calculated for each conversational code of interest, in which frequencies of each code were averaged across the number of events that are discussed during the reminiscing conversation. For this project, averages were calculated for maternal general memory questions: elaborations, maternal yes-no questions: elaborations, maternal statements: elaborations, and for each of the six maternal associative talk codes. Composite, or summary, total elaboration and total associative talk scores were calculated for mothers. The total elaboration score for mothers was calculated by adding the average general memory questions: elaborations, yes-no questions: elaborations, and the statement: elaborations. The total associative talk scores for mothers were calculated by adding the averages of the six association codes.

  Child Coding Categories. The primary child codes were Memory Elaborations (new information provided), Memory Repetitions (repeated information from either child or mother), as well as Associative Talk (statements or questions were made that were related, though not directly, to the event under discussion). There were six classifications of Associative Talk: Event (about a comparable previous event; e.g., "We saw fireworks a different night, didn't we?"), General Knowledge (related facts about the world; e.g., "Ponies are baby horses."), Fantasy (rather than factual; e.g., "I can fly as high as an airplane."), Future (future occurrence of event; e.g., "When can we go there again?"), Demo (acting elements out), and Scripted/Prep Talk (how we generally do things).

As was done with the maternal conversational coding, frequencies of child codes were calculated separately for each event discussed in the conversation, and then an average was calculated by adding the frequencies of that code across events and then dividing by the number of events discussed. Thus the total elaboration score for children was simply the average memory elaborations across events. The total associative talk score for children was calculated by adding the averages of the six association codes.

Reliability and Data Management. In order to establish reliability with the coding scheme for the mother-child reminiscing task, a research assistant and a master coder from the research team coded 25% of the transcripts independently at each time-point (36 and 60 months). Each reliability file was then compared, differences were noted, and coding discrepancies were resolved. The standard criterion for inter-rater reliability of each of the transcripts was a percent agreement of 85%, with no single reliability estimate less than 80% (Haden, 1998; Reese, Haden, & Fivush, 1993). Specifically for the 36 month MRM task, coding reliability was 91.24% agreement on 20% of the files, with no single reliability file having a percent agreement below 85%. For the 60 month MRM task, coding reliability was 93.90% percent agreement on 20% of the files, with no single reliability file having a percent agreement below 85%. After reliability was established, one of the coders completed the remainder of the files.

Results

Preliminary descriptive analyses of the sample as a whole (n = 113) revealed that children had a mean auditory comprehension score of 109.09 (*SD* = 19.34) on the PLS-4 at 36 months, with a minimum score of 50 and a maximum of 150. Means and standard deviations for all variables of interest from the mother-child reminiscing task are presented in Table 1. For example, as can be seen near the middle and bottom of Table 1, children's autobiographical

memory performance (average total memory elaborations) at 60 months ($M = 10.35$, $SD = 7.54$) was twice their earlier memory performance (average total memory elaborations score) at 36 months ($M = 5.06$, $SD = 4.24$). Additionally, the mothers' reminiscing styles were comparable at the two time-points, in that the average maternal total elaborations when their children were 36 and 60 months of age were 14.21 (SD = 7.59) and 17.04 ($SD = 10.74$), respectively.

We were also interested in dichotomizing the sample according to level of language comprehension ("high AC"/"low AC"), and then comparing differences in autobiographical memory performance and maternal use of elaborations between these groups. To identify participants who attained either a high or low level of auditory comprehension, a median split was conducted for the Auditory Comprehension subscale of the PLS-4. Children who scored above the median on this subscale were identified as "high AC", and those who scored below the median were identified as "low AC". With this dichotomized sample, we were able to note significant differences in all variables of interest. All means and standard deviations of these variables are presented in Table 2. For example, as can be seen near the top of Table 2, there was a significant difference in the average child memory elaborations at 36 months between the "low AC" group 3.48($SD = 3.12$)and the "high AC" group 6.68($SD = 4.63$). There was a significant difference in the average maternal total elaborations utilized at 36 months in the "low AC" group, 11.69(SD = 7.28), and "high AC" group 16.77(SD = 7.09), respectively.

The first research question that we addressed in the study was whether or not children's auditory comprehension (AC) scores at 36 months could predict their autobiographical memory performance at 36 months, as measured by the average number of child memory elaborations made in the mother-child reminiscing task. A Pearson product-moment correlation coefficient revealed a significant, positive correlation between children's auditory comprehension scores at

36 months and their autobiographical memory performance at the same time-point ($r = .51$, $p <$ .01). This allowed us to see how auditory comprehension and autobiographical memory performance were associated when both measures of AC and autobiographical memory performance were treated as continuous variables. As auditory comprehension scores increased, so does autobiographical memory performance as measured by the amount of child elaborations in the mother-child reminiscing task. The correlation between auditory comprehension and autobiographical memory is displayed, along with other associations, in Table 3.

To explore further this association, we also examined the mean elaboration scores of the children in the two groups that were formed on the basis of the median split on the auditory comprehension scores at 36 months. Consistent with the means presented in Table 2, an independent samples t-test revealed that the autobiographical memory performance of children differed significantly as a function of their auditory comprehension scores at 36 months, $t(111) =$ -4.3, $p < .001$. Therefore, autobiographical memory performance of children in the "low AC" group at 36 months was significantly different from that of the children in the "high AC" at that age, such that children in the "low AC" group had significantly fewer memory elaborations in reminiscing when compared to their peers in the "high AC" group. The memory elaboration means for the two groups of children at 36 months are also displayed on the left side of Figure 1.

The second research question we asked was whether or not children's AC scores at 36 months could predict maternal reminiscing style in a mother-child reminiscing task concurrently. In order to examine the relation continuously, we calculated a Pearson product-moment correlation coefficient and found that children's auditory comprehension at 36 months was significantly, positively correlated with maternal total average elaborations in reminiscing concurrently ($r = .43$, $p < .01$), as can be seen in Table 3. As child auditory comprehension

scores increased, mothers tended to utilize a more elaborative style in the mother-child

reminiscing context (Table 3). Utilizing the same "high AC"/ "low AC" group classification

referenced above, an independent samples t-test revealed that maternal style in the mother-child

reminiscing task varied significantly as a function of child auditory comprehension scores at 36

months, $t(111) = -3.76$, $p < .001$. The reminiscing style of mothers whose children were

classified as the "low AC" group at 36 months significantly differed from the reminiscing style

of mothers whose children were in the "high AC" group, such that mothers with children

classified as "low AC" used less average total memory elaborations than mothers with children

classified as having "high AC". The memory elaboration means for the mothers of the two

groups of children at 36 months are also displayed on the right side of Figure 1.

Thirdly, we were interested in whether or not a child's auditory comprehension score

(AC) at 36 months could predict their autobiographical memory performance and maternal

average total elaborations in reminiscing at 60 months. However, it was necessary to first

understand the longitudinal nature of children's autobiographical memory development and

maternal reminiscing style before including auditory comprehension into the analyses. As

included in Table 3, we used a Pearson product-moment correlation coefficient to assess the

association between children's autobiographical memory performance at 36 months and their

autobiographical memory performance at 60 months, and found that a significant positive

correlation was present ($r = .43$, $p < .01$). Children's early memory performance was predictive

of their later memory performance. Similarly, average maternal total elaborations in reminiscing

at 36 months was significantly correlated with average maternal total elaborations in reminiscing

at 60 months ($r = .41$, $p < .01$). Thus, mothers' use of elaborations when their children were 36

months old was predictive of their elaborations in reminiscing when their children were 60 months old.

We then used a Pearson product-moment correlation coefficient in order to longitudinally examine the relation that auditory comprehension at 36 months and maternal use of elaborations in reminiscing and autobiographical memory performance in children. Children's auditory comprehension at 36 months was significantly correlated with their autobiographical memory performance at 60 months ($r = .24$, $p < .05$), as well as maternal average total elaborations at 60 months ($r = .27$, $p < .05$). These correlations can also be found in the middle and bottom left corner of Table 3.

Interestingly, a significant, negative correlation emerged between children's auditory comprehension at 36 months and maternal use of associations in the mother-child reminiscing task at 60 months ($r = -.25$, $p < .01$), as presented in bottom left corner of Table 3. In other words, a lower level of auditory comprehension at 36 months of age was associated with mothers who utilized more associations when reminiscing with their children at 60 months. It is important to reiterate that a significant, positive correlation emerged between child auditory comprehension at 36 months and maternal average total elaborations utilized within the reminiscing context at 60 months. Therefore, higher levels of comprehension at 36 months were associated with mothers utilizing more elaborations, but fewer associations in the reminiscing context longitudinally.

To examine these correlations further, we compared the performance at 60 months of the two groups of children who had been classified on the basis of their auditory comprehension scores and then carried out independent samples t-tests. Reflecting the means in Table 2, the

children's mean elaboration scores at 60 months are plotted in the left portion of Figure 2, the children's autobiographical memory performance in the mother-child reminiscing task at 60 months differed significantly as a function of child auditory comprehension scores ("high AC"/ "low AC") at 36 months, $t(111)= -2.05$, $p < .05$. Similarly, maternal elaborations in mother-child reminiscing task at 60 months varied significantly as a function of child auditory comprehension scores at 36 months, as can be seen in Table 2 and the right portion of Figure 2, $t(111)= -2.33$, $p < .05$, such that mothers with children classified as "low AC" at 36 months utilized significantly fewer memory elaborations in the MRM task at 60 months. In summary, both child autobiographical memory performance and maternal use of elaborations at the 60 month time point differed significantly as a function of child AC scores at 36 months. Longitudinally, auditory comprehension scores at 36 months were correlated with autobiographical memory performance and elaborative maternal reminiscing style at 60 months; indeed, high AC scores was predictive of higher autobiographical memory performance in children and a more elaborative reminiscing style in mothers, both concurrently and longitudinally.

Discussion

Child Auditory Comprehension & Autobiographical Memory (36 months)

Children's auditory comprehension scores at 36 months were correlated with the extent to which they used memory elaborations in the context of a concurrent mother-child reminiscing task. In other words, the extent to which children comprehended language when they are 36 months was related to their autobiographical memory performance at that age. Furthermore, the autobiographical memory performance of children who were classified as "low AC" at 36 months was lower than the performance of those children classified as "high AC" at that time.

By looking at a child's language comprehension ability, it is possible to predict their autobiographical memory performance; a 36 month-old child who has a higher level of language comprehension is more likely to have more detailed autobiographical memories at that time as well, at least in a mother-child reminiscing context.

This significant correlation between children's early language comprehension and autobiographical memory performance further supports previous findings on the impact that individual differences in child language abilities may have on their autobiographical memory development (Fivush et al., 2006). However, research thus far has limited the consideration of child language ability to expressive and productive communication measures. When considering the theory that language expression and comprehension are distinct processes that have different functions within memory development, it is important to assess their impact separately (Baumwell, Tamis-LeMonda, & Bornstein, 1997). As a result, in the current study we have shifted the focus of investigation to the comprehensive facet of language in children, and the findings indicated that comprehension is, indeed, predictive of autobiographical memory, both concurrently and over time. If language can be seen as a memory "tool" that children use to form and report memories of their personal past, then language comprehension appears to be an important variable in the optimal functioning of this tool, particularly in the context of social learning theory (Vygotsky, 1978). Regardless of what children may be able to produce while reminiscing with others during a conversation, their level of language comprehension could impact the ability to learn necessary skills from social interactions. The current study has illuminated that individual differences may exist in children's language comprehension, and the fact that this variability is related to their ability to report autobiographical memories.

Child Auditory Comprehension & Maternal Reminiscing Style (36 months)

Children's auditory comprehension scores at 36 months were correlated with their mothers used elaborations in a concurrent mother-child reminiscing context. In other words, the extent to which children comprehend language when they were 36 months was related to how their mother's reminisced with them at that age, such that the higher children's AC scores were, the more memory elaborations mothers provided in the MRM task. Furthermore, the way that mothers reminisced with children classified as "low AC" at 36 months was significantly different from the way that mothers reminisced with children in the "high AC" group; that is, mothers of "low AC" children provided significantly less memory elaborations in conversations about the past than did mothers with "high AC" children. By looking at a child's level of language comprehension at 36 months, it is possible to predict the amount of elaborations that their mothers use in a mother-child reminiscing context. A 36 month-old child who has a higher level of language comprehension is more likely to have a mother who utilizes a more elaborative conversational style at that age.

These results support past research that revealed a general association between children's language ability and the extent to which their mothers utilize an elaborative reminiscing style (Farrant & Reese, 2000; Fivush et al., 2006). However previous research has limited the definition of a child's language ability to their level of expressive communication in conversation. Mothers tended to be more elaborative with children who had higher productive language skills and therefore contributed more in the mother-child reminiscing context (Farrant & Reese, 2000; Newcombe & Reese, 2004; Welch-Ross, 1997). Extending this work, in the current study we have demonstrated that there is also a correlation between children's language comprehension ability and the conversational style that mothers utilize when reminiscing. This

may indicate that mothers are somehow aware of the extent to which their children comprehend language early in life, and therefore structure conversations differently according to their children's individual needs. Conversely, the number of elaborations that mothers utilize in their reminiscing style may have an impact on their children's level of language comprehension. Those mothers who have a more elaborative reminiscing style are more likely to have children with higher auditory comprehension scores, and vice versa.

This directional ambiguity points to the main limitation of the current study. All of the associations discussed are correlational in nature, and therefore causality cannot be determined. We are not able to make conclusions about whether it is child characteristics that influence their mother's behavior, or whether mother's behavior may be influencing the development of certain child characteristics. This is particularly the case with regard to the mother-child reminiscing measure utilized in this study, as there is no independent assessment of the child's autobiographical memory skill. Compared to a measure such as a child independent narrative, in which children are asked by a researcher to discuss memories of a past event on their own, the mother-child reminiscing task is very mother-driven. Generally, the memory elaborations that children produce in this context are related to the questions and leads that their mothers provide. Although children may certainly have the potential to talk endlessly about their memories of a past event, they will most likely follow their mother's lead in terms of what to report. Therefore, it would be interesting to replicate this study using a more child-driven, independent measure of autobiographical memory in order to more accurately assess child memory development separate from maternal influence.

Child Auditory Comprehension at 36 Months as a Longitudinal Predictor

Children's auditory comprehension scores at 36 months were also correlated with the number of memory elaborations they made in a mother-child reminiscing context at 60 months. The same pattern was present between children's early auditory comprehension (36 months) and their mother's use of elaborations in a mother-child reminiscing context at 60 months. Interestingly, lower levels of child auditory comprehension at 36 months of age were related to mothers who utilize more associations when reminiscing with their children at 60 months. These data provide a twist in the way that mothers talk to their children about the past. Given that there was a significant, positive correlation between children's auditory comprehension at 36 months and their mother's use of elaborations within the reminiscing context at 60 months, a negative correlation between language comprehension and maternal use of associations in a reminiscing context may indicate that a trade-off in technique is taking place. Mothers of children who have high levels of language comprehension at 36 months utilize more elaborations and fewer associations in the reminiscing task at 60 months. Conversely, mothers of children who have lower levels of language comprehension at 36 months tend to utilize fewer elaborations and more associations when reminiscing with their child at 60 months. As mentioned earlier, associative talk includes statements or questions made that are related, though not directly, to the event under discussion, and generally provide an opportunity for expansion upon the topic being discussed, as well as creating more ways for the child to think about the concepts being recalled.

With this definition in mind, it is interesting to consider that mothers use associative talk more when their children have lower language comprehension as an additional means of cuing their child's memory in reminiscing conversations. Those children who have higher language comprehension abilities may not need their mothers to associate the event being discussed to

other relevant experiences, but may benefit from an elaborative style with more open-ended

question and statements that provide lots of new information. However, these considerations

require future research on a mother's ability to adapt her style, whether consciously or

unconsciously, as a means of responding to her child's individual needs. Similar to the structure

created by researchers of earlier studies in which children's autobiographical memory

performance improved after mothers were successfully trained to utilize a highly elaborative

reminiscing style (Boland, Haden, & Ornstein, 2003; Peterson, Jesso, & McCabe, 1999; Hedrick,

Haden, & Ornstein, 2009), it may be possible that mothers could be trained to reminisce in a

more associative manner with their children. It would be interesting to then have children with

low and high levels of auditory comprehension interact with mothers who are instructed to

reminisce with them in both an elaborative and associative manner, and note how

autobiographical memory performance of children differs as a function of their language

comprehension as well as the specific reminiscing style their mothers used.

Both children's autobiographical memory performance and their mothers' reminiscing

style at 60 months of age differed significantly as a function of their language comprehension

when they were 36 months old. Children who had lower language comprehension at 36 months

were more likely to have lower memory performance at 60 months as well as mothers who

utilized a less elaborative reminiscing style when they were older. These findings are important

because they illuminate the longitudinal nature of the correlations between children's auditory

comprehension and autobiographical memory performance, as well as maternal reminiscing style

as discussed earlier. Although correlational in nature, these data indicate that we are able to look

at a child's early language comprehension, and predict their autobiographical memory

performance later in life. Given that maternal reminiscing style appears to be consistent over

time as well, looking her child's early language comprehension as well as her use of elaborations when her child is young could predict her use of elaborations as her child develops.

Conclusion and Future Directions

The development of autobiographical memory in children is influenced by a number of factors, including children's social interactions, their language skills, and their cognitive capacities. Through mother-child reminiscing, children are able to emotionally engage with others, practice communicating about memories of past experiences, and importantly, learn from the way that their mothers choose to talk about the past. As a greater understanding of narrative structure is achieved, autobiographical memory in children becomes more efficient with a linguistic "tool" to better encode, store, and ultimately retrieve memories (Fivush et al., 1996). However, it is important to consider the individual characteristics that both mothers and children bring into the reminiscing context, and the impact that such variability may have on these important processes of memory development.

Whereas previous research has provided an interesting foundation regarding the impact maternal reminiscing style has on child autobiographical memory development, it is important to extend these findings to include variables of child characteristics as well. The current study has revealed that children's level of auditory comprehension is significantly related to their autobiographical memory development as well as to how their mothers talk to them in a reminiscing context, both concurrently and longitudinally. Without considering individual child characteristics in this relation, we may be missing an opportunity to further understand a mother's unique ability to help her child remember the past. Future research is needed to

determine if and how mothers are able to respond to their child's individual language needs by altering their reminiscing style.

It is also interesting to consider the impact that other individual characteristics of both mother and child may further influence these associations between language, maternal reminiscing style and autobiographical memory. The Durham Child Health and Development study (from which the current study's sample was drawn) represents a large scale effort to obtain a wide variety of measures of the performance of an unusually diverse sample. Through these data, factors such as gender, race, and socio-economic status could be included into analyses in order to make these conclusions more generalizable to all populations.

References

Bates, E., Thal, D., Whitesell, K., Fenson, L., & Oakes, L. (1989). Integrating language and

    gesture in infancy. *Developmental Psychology*, *25*(6), 1004-1019. doi:10.1037/0012

    1649.25.6.1004

Bauer, P. J., & Wewerka, S. (1995). One- to two-year-olds' recall of events: The more expressed,

    the more impressed. *Journal of Experimental Child Psychology*, *59*(3), 475-496.

    doi:10.1006/jecp.1995.1022

Baumwell, L., Tamis-LeMonda, C. S., & Bornstein, M. H. (1997). Maternal verbal sensitivity

    and child language comprehension. *Infant Behavior & Development*, *20*(2), 247-258.

    doi:10.1016/S0163-6383(97)90026-6

Boland, A.M., Haden, C.M., & Ornstein, P.A., (2003). Boosting children's memory by training

    mothers in use of an elaborative conversational style as an event unfolds. *Journal of*

    Cognition and Development, *4*(1), 39-65.

Farrant, K., & Reese, E., (2000). Maternal style and children's participation in reminiscing:

    Stepping stones in children's autobiographical memory development. *Journal of*

    Cognition and Development, *1*(2), 193-225.

Fenson, L., Pethick, S., Renda, C., Cox, J. L., Dale, P. S., & Reznick, J. (2000). Short-form

    versions of the MacArthur Communicative Development Inventories. *Applied*

    Psycholinguistics, *21*(1), 95-115. doi:10.1017/S0142716400001053

Fivush, R., (1998). The stories we tell: How language shapes autobiography. *Applied Cognitive*

    Psychology, 12, 483-487.

Fivush, R., & Reese, E. (1992). The social construction of autobiographical memory. In M.A.

    Conway, D.C. Rubin, H. Spinnler, & W.A. Wagenanr (Eds.), *Theoretical perspectives on*

    autobiographical memory (pp. 115-132). The Netherlands: Kluwer Academic Publishers.

Fivush, R., Reese, E., & Haden, C. A. (2006). Elaborating on elaborations: Role of maternal
    reminiscing style in cognitive and socioemotional development. *Child Development, 77*,
    1568- 1588.

Fivush, R., Haden, C., & Reese, E. (1996). Remembering, recounting, and reminiscing: The
    development of autobiographical memory in social context. *Remembering our past:
    Studies in autobiographical memory* (pp. 341-359). New York, NY US: Cambridge
    University Press.

Haden, C.A. (1998). Reminiscing with different children: Relating maternal stylistic consistenct
    and sibling similarity in talk about the past. *Developmental Psychology, 34*, 99-114.

Haden, C.A., Ornstein, P.A., Eckerman, C.O., & Didow, S.M., (2001). Mother-child
    conversational interactions as events unfold: Linkages to subsequent remembering. *Child
    Development*, *72*(4), 1016-1031.

Haden, C. A., Ornstein, P. A., Rudek, D. J., & Branstein, D. (2009). Reminiscing in the early
    years: Patterns of maternal elaborativeness and children's remembering. *International
    Journal of Behavioral Development*, *33*(2), 188-130.

Harley, K., & Reese, E. (1999). Origins of autobiographical memory. *Developmental
    Psychology*, *35*(5), 1338-1348. doi:10.1037/0012-1649.35.5.1338

Hedrick, A. M., Haden, C. A., & Ornstein, P. A. (2009). Elaborative talk during and after an
    event: Conversational style influences children's memory reports. *Journal of Cognition
    and Development*, *10*, 188-209.

Hudson, J.A. (1990). The emergence of autobiographic memory in mother-child conversations.
    In R. Fivush & J.A. Hudson (Eds.), *Knowing and remembering in young children* (pp.
    166-196). New York: Cambridge University Press.

McCabe, A., & Peterson, C. (1991). Getting the story: A longitudinal study of parental styles in

    eliciting narratives and developing narrative skill. In A. McCabe & C. Peterson (Eds.),

    Developing narrative structure (pp. 217-253). Hillsdale, NJ: Erlbanm

Nelson, K., & Fivush, R. (2004). The Emergence of Autobiographical Memory: A Social

    Cultural Developmental Theory. *Psychological Review*, *111*, 486 – 511.

Newcombe, R., & Reese, E., (2004). Evaluations and orientations in mother-child narratives as a

    function of attachment security: A longitudinal investigation. *International Journal of*

    Behavioral Development, *28*(3), 230-245.

Ornstein, P.A., Haden, C.A., & Elischberger., (2010). Learning to talk about the past: Evidence

    from longitudinal and experimental approaches. *Developing Memory: Development- and*

    Educational-Psychological Research on Human Memory, 1-20.

Ornstein, P. A., Haden, C.A., & San Souci P.P., (2008). The development of skilled

    remembering in children. Learning and Memory: *A Comprehensive References*, 1-4,

    715-744.

Peterson, C., Jesso, B., & McCabe, A., (1999). Encouraging narrative in preschoolers: an

    intervention study. *Journal of Child Langauge, 26*(1), 49-67.

Reese, E., & Brown, N. (2000). Reminiscing and recounting in the preschool years. *Applied*

    Cognitive Psychology, *14*(1), 1-17. doi:10.1002/(SICI)1099-0720(200001)14:1<1::AID

    ACP625>3.0.CO;2-G

Reese, E., Haden, C.A., & Fivush, R., (1993). Mother-child conversations about the past:

    Relationships of style and memory over time. *Cognitive Development, 8*, 403-430.

Reese, E., & Newcombe, R. (2007). Training mothers in elaborative reminiscing enhances children's autobiographical memory and narrative. *Child Development*, *78*(4), 1153-1170. doi:10.1111/j.1467-8624.2007.01058.x

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press.

Welch-Ross, M. K. (1997). Mother–child participation in conversation about the past: Relationship to preschoolers' theory of mind. *Developmental Psychology*, *33*, 618 – 629.

Zimmerman, I.L., Steiner, V.G., & Pond, R.E. (2002). *The Preschool Language Scale: Fourth Edition, Examiner's Manual*. The Psychological Corporation, San Antonio, TX.

Table 1

Descriptive Statistics (Overall Sample)

	N	Minimum	Maximum	Mean	Std. Deviation
PLS4: AC Standard Score	113	50	150	109.19	19.344
Avg. Maternal Total Elaborations (36 mo.)	113	1.00	38.00	14.2109	7.59359
Avg. Maternal Total Associations (36 mo.)	113	0.00	67.00	4.0332	8.15562
Avg. Child Memory Elaborations (36 mo.)	113	0.00	28.00	5.0619	4.24147
Avg. Maternal Total Elaborations (60 mo.)	113	2.50	74.00	17.0376	10.73684
Avg. Maternal Total Associations (60 mo.)	113	0.00	64.00	9.2471	10.93249
Avg. Child Memory Elaborations (60 mo.)	113	.67	51.00	10.3466	7.53929

Table 2

Descriptive Statistics (High vs. Low)

	PLS4: **AC Standard Score** **(36 mo.)**	N	Mean	Std. Deviation
Avg. Maternal Total Elaborations (36 mo.)	Low Group	57	11.69	7.28
	High Group	56	16.77	7.09
Avg. Maternal Total Associations (36 mo.)	Low Group	57	4.62	7.20
	High Group	56	3.43	9.05
Avg. Child Memory Elaborations (36 mo.)	Low Group	57	3.48	3.12
	High Group	56	6.68	4.63
Avg. Maternal Total Elaborations (60 mo.)	Low Group	57	14.75	8.87
	High Group	56	19.36	11.99
Avg. Maternal Total Associations (60 mo.)	Low Group	57	10.05	14.00
	High Group	56	8.43	6.51
Avg. Child Memory Elaborations (60 mo.)	Low Group	57	8.92	5.62
	High Group	56	11.79	8.91

Table 3

Correlations between Maternal Reminiscing Style and
Children's Autobiographical Memory

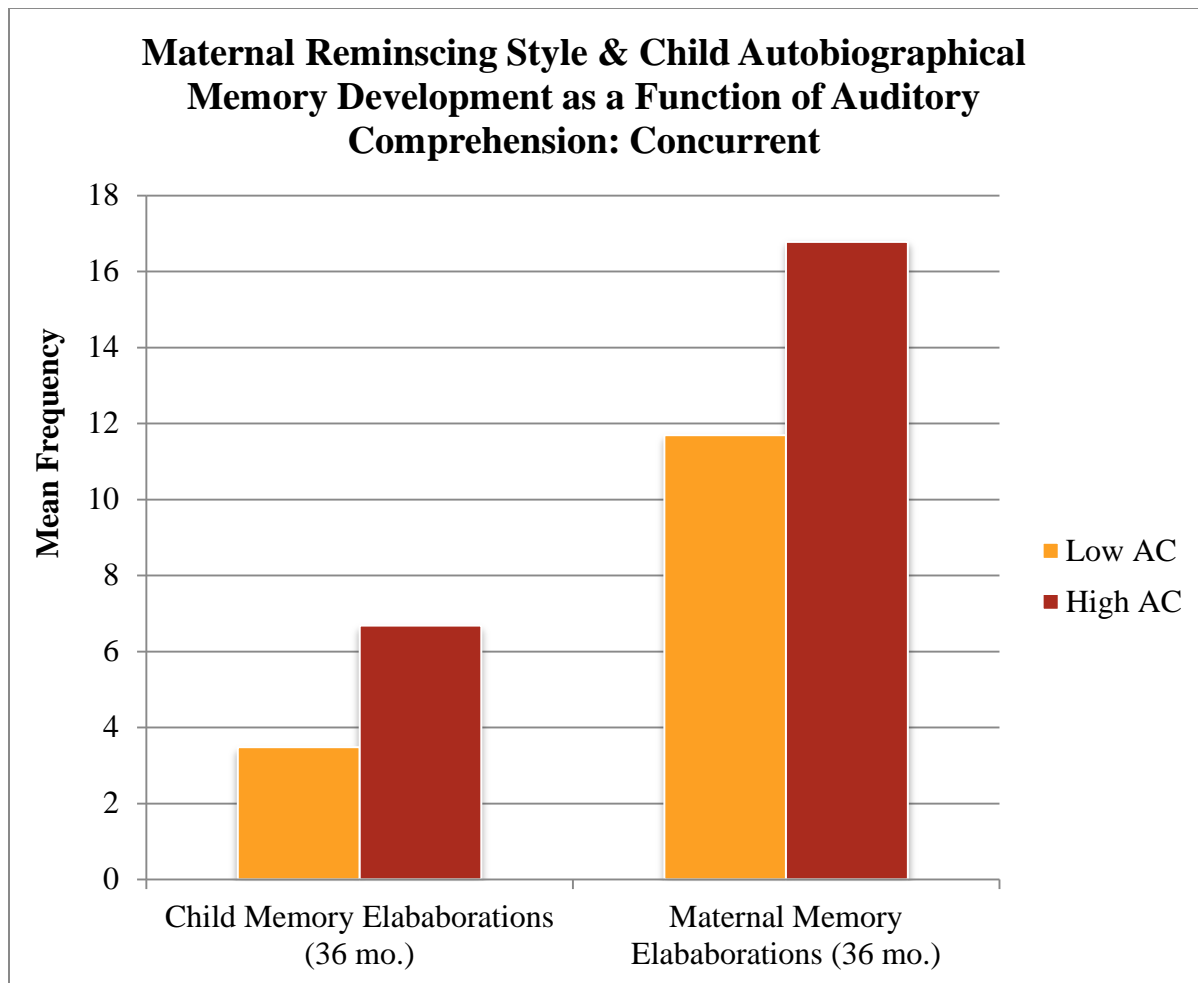|	PLS4: AC Standard Score (36 mo.)	Avg. Maternal Total Elaborations (36 mo.)	Avg. Child Memory Elaborations (36 mo.)
Avg. Maternal Total Elaborations (36 mo.)	0.429**	--	--
Avg. Child Memory Elaborations (36 mo.)	0..511**	0.714**	--
Avg. Maternal Total Elaborations (60 mo.)	0.269**	0.407**	0.344**
Avg. Maternal Total Associations (60 mo.)	-0.249**	0.048	-0.089
Avg. Child Memory Elaborations (60 mo.)	0.237*	0.341**	0.430**

*$p < .05$. **$p < .01$.

Figure 1

Maternal Reminscing Style & Child Autobiographical Memory Development as a Function of Auditory Comprehension: Concurrent

Figure 2

Maternal Reminscing Style & Child Autobiographical Memory Development as a Function of Auditory Comprehension: Longitudinal